

PHYS040B: Unofficial Formula Sheet

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0 General relationships

$$\begin{array}{lll}\mathbf{F}_{\text{net}} = m \frac{d^2 \mathbf{x}}{dt^2} & \mathbf{F} = -\nabla U & U = -\int \mathbf{F} d\mathbf{x} \\ K = \frac{p^2}{2m} & a_\phi = v^2/r & W = -\Delta U \\ \omega = 2\pi f & T = 1/f & \end{array}$$

1 Gravitation

$$\begin{array}{ll}\mathbf{F} = \frac{Gm_1m_2}{r^2} \hat{r} & U = -\frac{Gm_1m_2}{r} \\ v = \sqrt{GM/r} & T^2 = \frac{4\pi^2}{GM} r^3\end{array}$$

2 Fluids

$$\begin{array}{ll}P = \frac{F}{A} & P = P_0 + \rho g d \\ F_1 = \frac{A_1}{A_2} F_2 + \rho g h A_1 & F_B = \rho_f V_f g \\ v_1 A_1 = v_2 A_2 & P + 1/2 \rho v^2 + \rho g h = \text{constant}\end{array}$$

3 Oscillations

$$\begin{array}{lll}x(t) = A \cos \omega t + \phi & \omega = \sqrt{k/m} & \mathbf{F} = -k\mathbf{x} \\ v_{\text{max}} = A\omega & T = 2\pi \sqrt{m/k} & U = 1/2 k x^2\end{array}$$